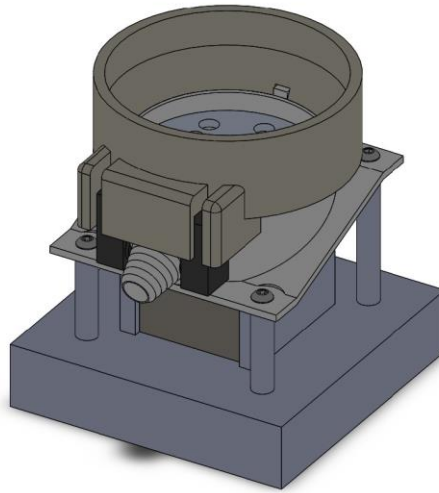


Open Source Food Pellet Dispenser

v1.0



Summary

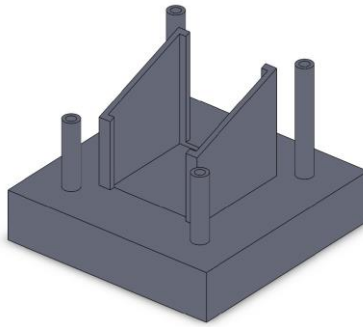
This food pellet dispenser was developed by Dr. Andrew Maurer's Lab in the McKnight Brain Institute at the University of Florida. The dispenser consists of four separate 3D printed components and uses a bipolar stepper motor to dispense individual 45mg food pellets. An infrared break-beam attached to one of the external interrupt pins is used to keep track of how many pellets have been dispensed. The dispenser is designed to be operated with an Arduino using an Adafruit motor driver shield and can be adapted to any other micro-controller and H-bridge.

Part List

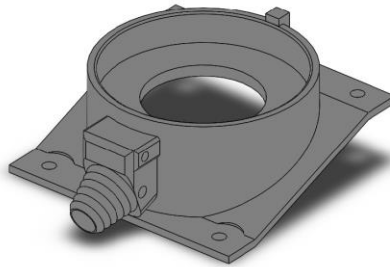
Description	Quantity	Supplier	Part Number
M3x0.5 Hex Nut	4	McMaster-Carr	90695A033
M3 35mm Socket Cap Screw	2	McMaster-Carr	92095A201
M3 50mm Socket Cap Screw	2	McMaster-Carr	92095A475
3mm IR Break-beam	1	Adafruit	2167
Nema 14 Bipolar Stepper	1	Pololu	1208

The feeder consists of four separate 3D printed components:

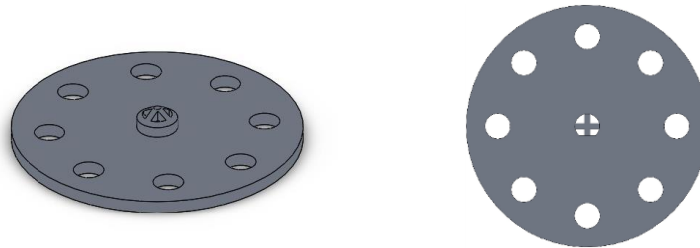
- 1) Motor Base – Designed to house a Nema 14 stepper motor



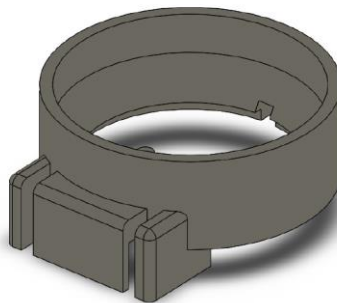
- 2) Dispenser Body



- 3) Rotor – Bottom view shows the slotted shaft hole



- 4) Feeder Cap – Holds break-beams in place with cutouts for wires



Code Examples

Break-beams are interrupt driven to keep track of the number of pellets dispensed. The Adafruit motor driver library was used to handle the motor control.

```
void beamBroken_isr(){
  noInterrupts();
  pells--;
  disp++;
  broken = true;
  Serial.println("Beam Broken");
  if(disp == 5){
    disp = 0;
    rot = !rot;
  }
  interrupts();
}
```

The dispenser is set to switch the direction of the rotor after every five steps. This was found to reduce jamming and crushed pellets. A delay of 100ms was added after each step to help the break-beams to detect individual pellets.

```
if (f == "disp" || f == "Disp") {
  pellsR = param;
  Serial.print("Dispensing ");
  Serial.print(param);
  Serial.println(" pellets");
  while(pells>0){
    if(rot == false){
      myMotor->step(25, FORWARD, SINGLE);
      delay(100);
    }
    else if(rot == true){
      myMotor->step(25, BACKWARD, SINGLE);
      delay(100);
    }
  }
}
```

